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New species *Koorchaloma* and *Ciliochorella* from xeric forests in Argentina

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Abstract— Two new species, *Koorchaloma scutiae* and *Ciliochorella buxifoliae,* isolated from leaf litter of *Scutia buxifolia* forest are described, illustrated, discussed, and compared with similar species. The specimens were collected in Magdalena, Buenos Aires province, Argentina. The type specimens are deposited in LPS. Keys are provided to all species of both genera.

Key words— anamorphic fungi, taxonomy

Introduction

Xeric forests dominated by *Scutia buxifolia* Reissek (*Rhamnaceae*) and *Celtis tala* Gillies ex Planch. (*Ulmaceae*) represent the most important woodland community ("La Pampa") in the eastern plains of Buenos Aires Province, Argentina (South America). They range from the banks of the Paraná River to the suburbs of Mar Chiquita town. The District of Magdalena has one of the most well preserved native forest areas, with an environmental heterogeneity that determines the variability in vegetation composition. Wooded ranges run parallel to the La Plata River, where the forest grows on highly calcareous substrates derived from Quaternary sea transgressions and regressions (Sánchez et al. 1976).

Several works have examined the fungal communities on decaying leaf litter of *Scutia buxifolia* and *Celtis tala* (Allegrucci et al. 2004, 2005, 2007; Crous et al. 2005). Yanna et al. (2001) noted that fungal species composition varies according to the different hosts and sites, which is particularly evident in the xeric forests of the Buenos Aires province (Allegrucci et al. 2009). This paper

describes two new species, *Koorchaloma scutiae* and *Ciliochorella buxifoliae*, recently recovered from *S. buxifolia* leaf litter during biodiversity surveys of this region.

Materials & methods

Study site— The study area lies in the Magdalena District, 20 km southeast of Magdalena town (35°11´S, 57°17´W) in the province of Buenos Aires, Argentina in a forested area dominated by *Scutia buxifolia* ("coronillo") and *Celtis tala* ("tala") and covering marine shell deposits that form parallel ridges along the coastline. See Arturi et al. (1997) for details on climate and forest ecology.

Sample Collection— Samples of leaf litter were collected from the forest, placed in zip-lock bags for transport to the laboratory, and stored in a refrigerator at 4°C until processed. Plant material was incubated at 25°C in Petri dish moist chambers (Elíades et al. 2007). Samples were examined over four weeks. Fungal species were examined with a Wild M8 stereo microscope and a Dialux 20 Leitz microscope.

Scanning Electron Microscopy— For the determination of fungal species in their natural substrate (leaf litter), material remained in formaldehyde at 1% for 4 hours and then postfixed with 2% formaldehyde for 12 hours. The fixative was removed by means of three consecutive washes with distilled water for subsequent dehydration. The fixing of the cultured material was modified with respect to time: a fixation was carried out in 1% formaldehyde for 3 hours and post-fixation in 2% formaldehyde for 4 hours. All the samples were then dehydrated in graded series of 30%, 50%, 70% and 100% ethanol (45 min in each concentration), the ethanol was replaced by liquid CO_2 and the samples dried by Critical Point (Blazers equipment, CP-30). All the samples were mounted onto double-sided carbon tape and gold plated in a Joel Fine Ion Sputter, JCF 100. Observations and photomicrographs were obtained with a Scanning Electron Microscope, JMS-T100, and with a JEOL Model 6340 LV Scanning Electron Microscope belonging to the Service of Electron Microscopy of the Museum of Natural Sciences of La Plata, Buenos Aires.

Taxonomy

Koorchaloma scutiae Alleg., Elíades & Aramb., **sp. nov.** Plate 1

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Foliicola conidiomata stromatica, dispersa, alba vel flavida gelatinosa usque 40–60 µm diam. Stroma basale parva ex cellulis isodiametricibus, atrobrunneis vel brunneis compositae. Setae penitus conidiomatis intersparsae, sterile, solitariae, non-ramosae, erectae, rectae, laeves, crassitunicatae, septate, brunneae, ad epicem pallidorae 170–400 µm longae, 10–15 µm latae ad basem, 3–5 µm latem ad apicem. Conidiophora macronematosa, erecta, ramosa, tenuitunicata, laevia, hyalina. Cellulae conidiogenae discretae, monoblasticae, terminales, subcylindricae, cum collario, laeves hyalinae 10–15 × 2–2.7 µm. Conidia 18–20 × 1.8–2 µm fusiformia ad apice rotundata ad basim truncata, laevia hyalina utrique appendices mucosas ferentia, in masso gregaria.

Typus: Argentina, Buenos Aires, Magdalena, in foliis mortuis Scutia buxifolia, Cazau 48245 (LPS, ***holotypus****), May 2004*

Etymology: referring to substrate genus, *Scutia*.

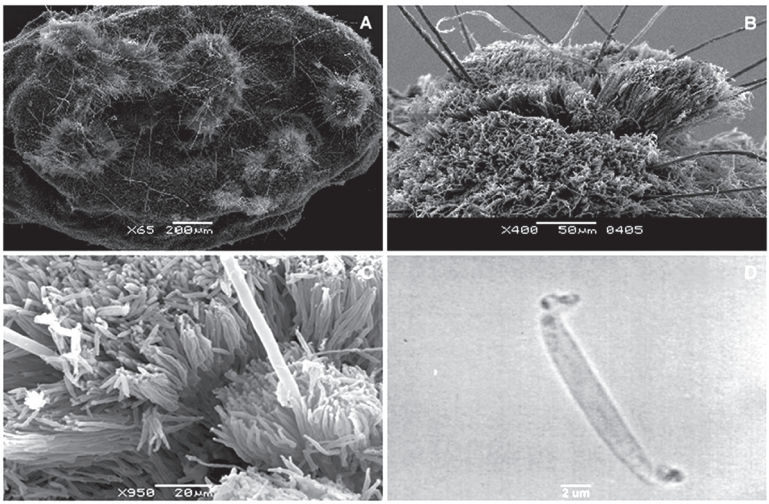

Plate 1. *Koorchaloma scutiae*. A. Conidiomata on natural substrate. B. Detail of conidiomata. C. Conidiophores, conidiogenous cells, conidia and setae. D. Conidium.

Folicolous conidiomata stromatic, scattered, pulvinate, gelatinous, white to creamy, rounded or irregular in outline, setose, 40–60 µm diam. Basal stroma thin of textura angularis with 4–5 layers of thick walled cells, dark brown. No margin was observed. Conidiomatal setae marginal and frequently interspersed, through the basal stroma straight, smooth walls, subcylindrical, unbranched, multiseptate, thick walled dark brown at the base, pale brown in the apex, 170–400 µm at the terminal cell which has telescopic growing. Conidiophores arising from the upper layer of cells of the basal stroma, irregularly branched, septate, hyaline, invested in mucus.

Conidiogenous cells discrete, monoblastic, subcylindrical with flaring collarettes, colourless, smooth 10–15 × 2–27 µm. Conidia 18–20 × 1.8–2 µm fusiform to slightly sigmoid with rounded base and truncated apex, mucoid appendage bearing in both extremes, funnel shape, mean conidium length/width 10:1.

Comments: *Koorchaloma* Subram. was proposed by Subramanian (1953) for the type species, *K. madreeya* Subram., collected on dead, rotting culms of *Oryza sativa* in India. The genus is characterized by sporodochial to acervular setose conidiomata (with setae either marginal or interposed through the basal stroma), holoblastic conidiogenesis, and unicellular, colourless, and fusiform conidia that bear mucoid appendages either only apically or at both ends (Nag Raj 1984, 1993). Nag Raj (1993) recognized five species: *K. madreeya*, *K. bambusae* Nag Raj, *K. jamaicensis* Nag Raj, *K. occidentalis* Nag Raj (Nag Raj,

1984), and *K. okamurae* I. Hino & Katum. (Hino 1961). Since this publication, five more species have been described — *K. novojournalis* Yanna et al. (Yanna et al. 1998), *K. galateae* Kohlm. & Volkm.-Kohlm. (Kohlmeyer & Volkmann-Kohlmeyer 2001), *K. spartinicola* V.V. Sarma et al. (Sarma et al. 2001), *K. dimorpha* Matsush. (Matsushima 2003), and *K. europaea* Treigienė (Treigienė 2006).

The new species, *K. scutiae,* which grows throughout the year on *Scutia buxifolia* leaf litter, is differentiated from other *Koorchaloma* species by its longer and wider conidia (length/width ratio = 10:1). Its macronematous conidiophores resemble those of *K. novojournalis,* which can be distinguished by shorter conidia (mean length/width ratio = 3.5:1). *Koorchaloma scutiae* is also resembles *K. jamaicensis*, described from grass blades in Jamaica, in setal structure and sporodochia, but the latter species produces distinctly broader conidia (mean conidium length/width ratio = 5.3:1).

Although two *Koorchaloma* species have *Kananascus* teleomorphs (Nag Raj 1984, 1993), no teleomorph is known for *Koorchaloma scutiae.*

Key to *Koorchaloma* species

1a. Marine habitat 2
1b. Non-marine habitat 3

2a. Mean conidium length/width ratio = 3.4:1 . . . . . *K. galateae*
2b. Mean conidium length/width ratio = 2.9:1 . . . . . *K. spartinicola*

3a. Species with *Acremonium* synanamorphosis. . . . . *K. dimorpha*
3b. Species without synanamorphosis 4

4a. Conidia bearing mucoid appendage usually at the apex only, conidioma not gelatinous 5
4b. Conidia bearing mucoid appendage usually at the apex only or at both ends, conidioma gelatinous 6

5a. Mean conidium length/width ratio = 2.8:1 . . . . . *K. okamurae*
5b. Mean conidium length/width ratio = 3.7:1 . . . . . *K. madreeya*

6a. Conidia bearing mucoid appendage usually at the apex only. . . . . *K. europaea*
6b. Conidia bearing mucoid appendage at both ends 7

7a. Conidia fusiform 8
7b. Conidia naviculate 9

8a. Conidiophores reduced to conidiogenous cells . . . . . *K. bambusae*
8b. Conidiophores macronematous 10

9a. Excipulum well developed; mean conidium length/width ratio = 5.3:1 *K. jamaicensis*
9b. Excipulum less developed; mean conidium length/width ratio = 3.9:1 *K. occidentalis*

10a. Mean conidium length/width ratio = 3.5:1 . . . . . *K. novojournalis*
10b. Mean conidium length/width ratio = 10:1 . . . . . *K. scutiae*

Ciliochorella buxifoliae Allegr., Elíades & Aramb., **sp. nov.** PLATE 2

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Foliicola, conidiomata stromatica, dissita vel gregaria, origene subcuticularia, in sectione lenticula 300–500 µm lat, 140–150 µm alt., unilocularia, glabra, brunnea, paries 20–35 µm cr., e textura angulari compositus. Conidiophora e cellulis strati intimi telae basalis conidiomatum enascentia, simplicia et basi 1–2 septata vel ad cellulas conidiogenas redacta, in muco involuta. Cellulae conidiogenae holoblasticae, ageniformes, hyalinae, laeves, 3–3.5 × 4–5 µm. Conidia subfusiformia, triseptata, 19–21 × 2.5–2.7 µm, appendices ferentia; cellula basalis obconica, hyalina, laevis 2–3 µm long; cellulae medianae duae, cylindraceae, subhyalinae, aliquantum inaequalis 8 µm long, cellula apicalis hyalina, laevis, cassa, in appendicem apicalem singularem attenuata; appendix basalis singularis, excentrica simplex attenuata 3–5 µm long; ratione conidii long./lat.= 7:1.

TYPUS: Argentina, Buenos Aires, Magdalena, in foliis mortuis Scutia buxifolia, Allegrucci & Cazau 48244 (LPS ***holotypus****) February 2005.*

ETYMOLOGY: referring to its leaf litter substrate species, *Scutia buxifolia*.

Folicolous conidiomata lenticular, stromatic, picnidioid scattered, subcuticular, conical in sectional view, 300–500 µm wide, 140–150 µm deep, unilocular, glabrous, pale brown, wall 20–35 µm thick, textura angularis, cells thin walled, pale brown to almost colourless with area of dehiscence ultimately breaking wide open. Conidiophores lining the cavity of the conidioma, unbranched, 1–2 septate at the base or reduced to conidiogenous cells, invested in mucus. Conidiogenous cells holoblastic, lageniform, hyaline, smooth 3–3.5 × 4–5 µm. Conidia subfusiform, slightly curved 3-septate 19–21 × 2.5–2.7 µm bearing appendages; basal cell obconical with a truncate base, hyaline, smooth, 2–3 µm long, devoid of contents; 2 median cells cylindrical, almost colourless, equal, 8 µm long, apical cell hyaline, smooth devoid of contents and modified into a branched appendage divided with 27–30 µm between both extremes; basal appendage single, eccentric, unbranched, attenuated, 3–5 µm long, mean conidium length/width ratio 7:1.

COMMENTS: The genus *Ciliochorella* Syd. was described in 1935 for the type species, *Ciliochorella mangiferae* (Sydow & Mitter 1935; see Sutton 1964 for a brief history of the genus). *Ciliochorella* is characterized by having cylindrical, straight or slightly curved conidia with euseptate pale brown middle cells, colourless end cells that bear a single, eccentric appendage. Nag Raj (1993) recognized three species: *C. splendida* Nag Raj & R.F. Castañeda (Nag Raj 1993), *C. castaneae* Munjal (Munjal, 1966), and *C. mangiferae* Syd. (Sydow & Mitter 1935). Although three other *Ciliochorella* species have been described, Nag Raj (1993) synonymized *C. eucalypti* T.S. Viswan. and *C. indica* Kalani with *C. mangiferae* and *C. bambusarum* Shanor with *Placonema bambusacearum* (Sacc. et al.) Petr.

The new species, *C. buxifoliae,* grows profusely throughout the year on *Scutia buxifolia* leaf litter. We placed our species into *Ciliochorella* because the

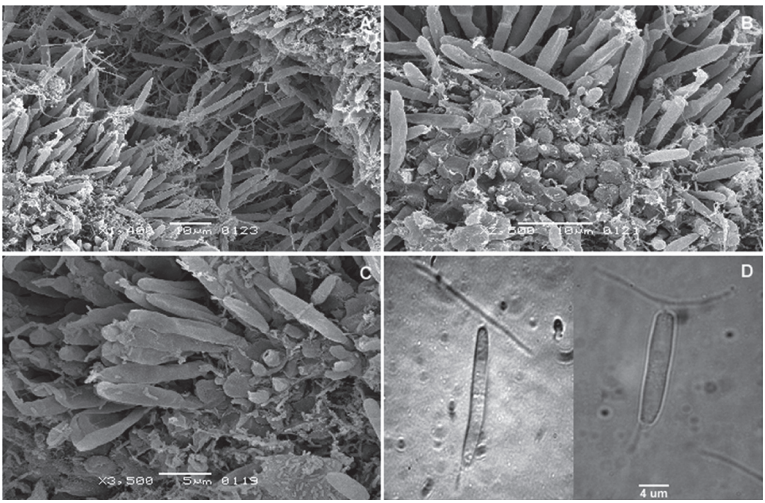

Plate 2. *Ciliochorella buxifoliae*. A–C. Conidiogenous cells and conidia. D. Conidium.

stromatic pycnidioid subcuticular adpressed to lenticular conidioma is never immersed in the host tissue; it differs from other *Cliochorella* species in size, septation, ramification, and form of the conidial appendage.

Ciliochorella buxifoliae differs from the three other species described above mainly by the longer and wider conidia. It most closely resembles *C. mangiferae,* which produces longer conidia (32–43 × 2.5–3.5 µm) with a mean conidium length/width ratio = 12.3:1.

Key to Ciliochorella species

1a. Conidiomata not lenticular ..... *C. splendida*
1b. Conidiomata lenticular 2
2a. Conidiophores 0–2 septate, branched occasionally reduced to conidiogenous cells ..... *C. castaneae*
2b. Conidiophores invariably reduced to conidiogenous cells 3
3a. Mean conidium length/width ratio = 12.3:1 ..... *C. mangiferae*
3b. Mean conidium length/width ratio = 7:1. ..... *C. buxifoliae*

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